

SyncWare News

The journal for technical
applications of T/S
computers

Volume 3 Number 2

Nov.-Dec. '85

QL Price Drops \$200.

Sinclair Research has announced that they have reduced the price of the QL to \$299. Even better news is that many of the distributors that you have come to know and love will be carrying the QL in their product lines. Besides the four bundled software packages (Word Processor, Graphics, Spreadsheet and Database) that come with the QL, there are ten new software titles that are available as well. They range from games like Chess to business applications. You can also join the Qclub for \$50.00, which entitles you to updates for the four canned programs and a bimonthly newsletter. If the QL intrigues you or if you plan to get one, we suggest that you contact your nearest distributor and show them your support.

Welcome Back Memotech

Memotech products make a return to the Sinclair peripheral market once again. Oxford Data, Inc., is now supplying Memotechs original hardware add-ons for the ZX81, 1000 and 1500 computers. The High Res Graphics, Memocalc, parallel I/F, RS232 and all of the rest are available once again. They also have reduced the price of the Memotech MTX512 computer to \$295. The bundled PC with CPM and disc drive is \$695.

Enter Q_Review?

SyncWare News has decided to support the QL fully, but not necessarily in this magazine. Since the QL is so radically different from all of the other TS/ZX computers, it deserves its own publication. We are VERY impressed with the QL and all of the capability that it possesses. We expect to start the new magazine early next year. We would like to here from you on your opinion of QL support, either in SWN or elsewhere. If you would like to sound off on this topic, then please address your thoughts to the Columbia address.

64 Column Basic: TS1000 Style!

It may sound incredible, but it's true. 64 column basic is available not only for the 2068, but it is here (almost) for the 1000 also!! If you have the Oliger Video board, then you have what it takes to utilize this software. Since the 1000 video board gives a rock steady display (and 8 colors per character), it really puts the 2068 display to shame. Our own Fred Nachbaur has developed this software. He says that after he finishes a few more Hi-Res utilities, it will be available for you. Stay tuned!

TS 2068 DISC SYSTEM

FD-68 INTERFACE

Controls 1-4 drives

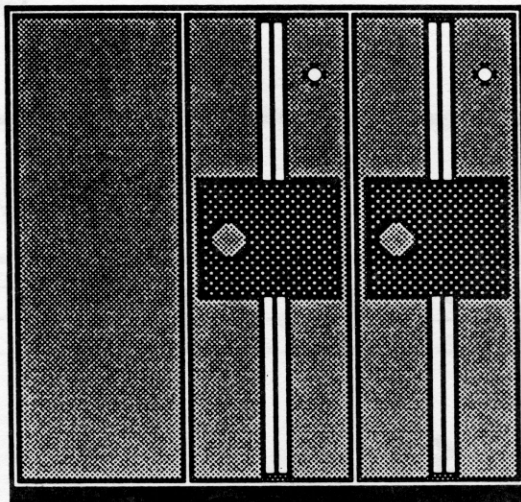
3 inch to 8 inch drives
Shugart compatible

Single or double sided

40/80 tracks per side

64K RAM (256K opt.)
& 8K ROM on board

RGB monitor output



SYSTEM COMPONENTS

\$199 FD-68 Interface

\$99 Drive 40T/DS/DD
5 inch/400 kilobyte

\$99 Dual Drive Cabinet
and 5 amp Pwr Pack

\$3 Per Item S&H

Texas Residents add 6%

VISA/MasterCard add 5%

Enhance the performance of your TS 2068 with the AERCO Disc System. All of the speed and convenience of a full-out floppy disc system. Save, load and copy programs at the industry standard of 250,000 bits/sec. Fully compatible with all Shugart type drives, including those already in use with the AERCO 1000 Disc System. The 64K of on-board RAM can be used as a second bank of system memory or for a full-blown CP/M System (version 2.2). The RGB output is crystal clear and rock steady. The power supply is a 5-amp high efficiency switcher. We offer a variety of other hardware for all models of sinclair-TIMEX.

NOW AVAILABLE: 256K UPGRADE \$50 (2-drive max) \$80 (4-drive max)

	<u>TS/2068</u>	<u>TS/1000-1500</u>
Floppy Disc Interface	\$199	\$179
Disc Drives	from 99	from 99
Power Supplies	99	99
Centronics Printer I/O	69	99
Dual RS-232C Serial I/O	99	99
C ITOH 8510 Printer	375	375
C ITOH 7500 Printer	275	275
ROM Bd. with Auto Disc Boot	n/a	59
RGB Cable (specify monitor)	30	n/a
CP/M (V. 2.2)	25	n/a

AERCO
ACME ELECTRIC ROBOT CO

Box 18093 Austin TX 78760
Ph (512) 451-5874

FOR YOUR SUPPORT

This column announces any software or hardware that is new or otherwise untested by us. If you have something of interest, send us a description of your product. We advise readers to send a SASE, as a courtesy, to the individuals or companies, for further information.

We know of several distributors that are supporting the QL as well as the other Sinclair computers. We have heard from the following suppliers to date:

Curry Computers
5344 W Banff, Glendale, AZ 85306

G. Russell Elec.
RD1 Box 539, Centre Hall, PA 16828

Sunset Elec.
2254 Taraval St., San Francisco, CA 94116

EZ Key
Suite 75, 711 Southern Artery, Quincy, MA 02169

Besides the above entries, we have also received new catalogs for all of the TS computers from the following companies:

E. Arthur Brown
3404 Pawnee Dr., Alexandria, MN 56308

Zebra Systems
78-06 Jamaica Ave., Woodhaven, NY 11421

Oxford Data
99 Cabot St., Needham, MA 02194

21st Century Elec.
6813 Polk St., Guttenberg, NJ 07093

RMG Enterprises
1419 7th St., Oregon City, OR 97045

Jack Dohaney
325 O'Connor St., Menlo Park, CA 94025

Aerco
Box 18093, Austin, TX 78760

John Olliger
11601 Whidbey Dr., Cumberland, IN 46229

Byte Back
Rt. 4 Box 54, Leesville, SC 29070

Tom Woods
PO Box 64, Jefferson, NH 03583

Budget Robotics & Computing
Box 18616, Tucson, AZ 85731

SyncWare Co.
Mtn. Stn. Box 12, Nelson, BC Canada V1L 5P1

There are so many new items available for you that there is just no way to fit them into one issue. We touch on the highlights here, but we suggest that if you did not get catalogs from the above list of suppliers that you take the time to request one from each. As we have stated in the past, continued support for you depends on YOUR interaction with vendors. Open communication channels with all of them. They will then keep you informed of the latest innovations on a timely schedule. To help defray their postage, please be kind enough to enclose a stamp.

Bruce Taylor of Budget Robotics, has written a soon to be published book (TAB #1935- "Build a Microcomputer Controlled Robot") and will have all of the boards available for you to construct your own ZX powered robot.

Fred Nachbaur of the SyncWare Co. has the CE AMP program for the 1000. This graphic program aids you in your design of transistor circuits (see Load Amp SWN 2/5 pg. 8). \$19.95 ppd.

Tom Woods has the 2068-32K NVM board for \$109.95, 1000 Extended Basic \$19.95, 1000 Wator Simulation, \$16.95, and an Experimentor's Universal I/O port for both machines for \$69.95. Software for this board is available which allows passing data between the 2068 and 1000 for \$16.95 and more.

John Olliger has his disk interface ready. It comes with his SAFE Disc Basic. Bare boards & Eprom, \$43.95; Full kit, \$97.95; assembled, \$119.95. The operating system will have updates.

Jack Dohaney has a variety of 2068 programs and enhancements for Mscript and Tasword. Jack's Fairware software includes Extended Basic, Keyword which allows you to type in basic keywords, Toolkit, Ezedit, and several Aerco Disk utility programs. They are \$5.00 each.

21st. Century Electronics is selling the Memotech MTX 512 for \$259.95. They also have an enclosed disk system for the 2068 with a Qume drive, controller with 64K ram and RGB output. The case will also hold your printer port inside. \$559.95

Zebra Systems has a host of new software. The OS64 cartridge is \$29.95. The Zebra Disk Drive is \$299.95 and box of 10 disks is \$39.95. The Greeting Card designer, which creates custom messages and prints them full size on an 80 column printer is \$19.95.

Steve Wyatt, PO Box 6239, Washington D.C., 20015, has a Real Time Clock board for the 2068. It is battery backed and will even account for leap year. The Clock is available for \$34.95 and includes driving software.

G. Russell Electronics has the Chromasoft program for the 1000 for \$14.95. It includes a filter for your black & white TV or Monitor.

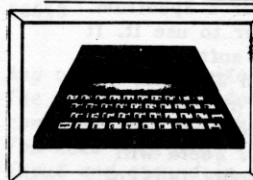
Tad Painter, Box 166055, Irving, TX has Voice software available for \$16.95. He also has a variety of talking games and utilities.



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Programmers Toolkit.....	\$14.95
ZX Pro-File (16K to 64K).....	\$16.95
ZX Data Finder.....	\$14.95
Z-Wryter (16K to 64K).....	\$12.95
Profit Plan.....	\$12.95
Quest for the Holy Grail & the Elusive Mr. Big.....	\$17.95
3D Black Star.....	\$ 9.95
Torpedo Attack.....	\$ 9.95
Games Pack (2K).....	\$14.95

TS2068 Programs	
Multi-Draw 2068.....	\$24.95
Softsync Assembler.....	\$19.95
Voice Chess.....	\$24.95
Personal Accountant.....	\$24.95



Please include check or money order. Calif. residents add 6% sales tax. Please add \$2.50 shipping and handling. No COT's - US funds only.

SEND NOW FOR FREE CATALOG!

BP - We have not abandoned basic computer users!

FORUM

In the last few months, a considerable amount of new software and hardware has become available for both 1000 and 2068ers. First, if you have a Spectrum emulator of some type, there is always new software from the UK. Get in touch with your favorite distributor for their latest catalogs. Some notable catalogs with English software are English Micro Connection, Knighted Computers, Sunset Electronics, Zebra Systems, to name a few. You may want to consider a postal money order (or credit card) and send directly to the companies in England yourself. We understand that the turn around time is 2 weeks.

Although support for the 1000 has diminished considerably, namely because those who are using this computer have already developed their systems, new developments are nevertheless forthcoming. A case in point is Fred's 64 column Basic. This is indeed an impressive piece of software. Bill Russell's Chromasoft software shows color on a black and white TV!! Although experimental, it too is amazing. This is an excellent educational item for understanding how light and time can affect what your eyes perceive. G. Russell Electronics also has several Hi Res games for the 1000.

For the 2068, the Zebra OS64 cartridge software provides a fully implemented 64 column Basic. It resides in the dock and runs as an LROS program. The software has several printer drivers built in (it does not support the 2040) and will do HiRes COPYs to your Epson compatible printer.

Tad Painter has created a world of talking software that requires no hardware additions. The Sound chip is used to its fullest capability. The words spoken are quite acceptable and the tone of the voice is very manly.

Notable hardware that's new would be the Interface 3 (for the Spectrum), which lets you make a snapshot of your memory. It works by breaking in to the program in question (at a nice breakpoint e.g., joystick menu) and dumping the RAM contents to tape. You then load in the supplied software followed by your broken program. You may then save the modified program to any convenient storage device. This all happens at the touch of a button. The IF3 contains its own 1K prom and .5K RAM.

For the 2068, the word is disk drives for hardware. The Olliger disk board is ready and comes with some snapshot software that saves the whole RAM area. This I/F uses the bank switching capability of the 2068 for the operating system and transfer buffer. The Kingsley operating system is not quite ready.

The Zebra disk system is the Timex Portugal system. This one has an extremely advanced operating system, but unfortunately comes configured for a Spectrum. You must use a twister board in order to use it. It comes with 2 RS232 ports and driving software. The Disk drives are the European standard 3" disks. The American standard is 3 1/2" and the disk are not interchangeable. We believe that these disks may be very hard to come by in this country. Zebra will supply them though. The 3" drives supply 140K of storage per side. You must flip them over manually. Several owners of this system tell me that they have already gone to the 5 1/4" drives, because of the standardization problem and lack of storage space!

The Aerco disk system comes with 64K of RAM and may now be expanded to 256K organized as 4-64K banks in the dock bank. They are accessed by a port call and swap out the whole dock bank in one shot. The chunk specs are not affected by this swap (see SWN 2/3 for more details on bank switching). They also have a mod that allows cartridge boards to run the the dock as well. This interface is the only one that makes full use of the bank switching ability of the 2068 and gives you RAM to work with. The FD68 board will support any size drive (that you specify) in any density.

The Ramex disk drive is an import that has been converted for use on the 2068. It requires an expensive quad drive and 4K of precious RAM in order to work. It does come with some bundled software that is preconfigured for the interface.

How about some Non-Volatile Memory! Tom Woods 32K NVM board allows you to save data or program in NVM that can reside in either the EXROM or Dock banks. Last issue incorrectly stated that this capability required extra internal decoding in your machine (SWN 2/3 pg. 19). This is not the case. You may freely flip a switch to reside in alternate banks. Data is battery backed and will stay that way, in or out of your 2068, for years.

The SyncWare News

Thomas B. Woods
Thomas J. Bent
Fred A. Nachbaur

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Jefferson, NH 03583
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Article submissions, issue tapes (when warranted), hardware and related tough questions should be addressed to:

Syncware News
Mountain Station Group Box 12
Nelson, British Columbia, Canada V1L 5P1
(604) 354 3858

Back issues of SWN are available for \$3.50 each. Volume #1 (for the 1000) is available for \$16.95.

SWN is done entirely on TS computers. Submissions are preferred as word processed text files (so we need not re-invent your article) on good tape. Memotext for the 1000 and 1500 and Mscript for the 2068 are preferred word processors. Documents submitted in Tasword Two and other word processors must be done in 52 column format. If you do not have a word processor, but you still have a good idea, then don't hesitate to work it up and submit it. SWN pays authors about \$40.00 per page for original articles. This amount will vary slightly from issue to issue and is paid when the article is published. Write for more information.

Dear Editor, I have a Zebra Graphics Tablet and Tech Draw software. My problem I believe is hardware related. 1. It causes my Aerco disk drives to turn on. 2. It is impossible to draw a line freehand from point A to point B because of the scatter. Do you have any remedies?

Several anonymous subscribers.

Yes. The Aerco disk problem is due to the 16 bit ports that it uses. Software that zeroes the A register prior to I/O will not cause any problems. However, Since there is no easy fix for the software, the disk interface can be modified to accomodate the Tech Draw interface. Aerco will modify the disk board for you if you desire. You can do it yourself by purchasing a 74LS08 (AND) and cutting the trace to pin 6 (M1not) of the LS138 on the disk board. Take M1 from the computer and AND it with A7 address line (line 22 on the bottom of the edge connector) and tie that output to the LS138 (chip D4 on the accompanying schematic) pin 6.

The splay problem is a more drastic problem. The ADC0809 A to D converter has a +/- 1 bit error inherent in the design of the chip. (That is the 28 pin chip with the numbers scratched off. The other chip is an LS27). It could be replaced with an ADC0808 which has a 1/2 bit error. This might help. The best solution is to get a Radio Shack color mouse (the one button mouse). The graphic tablet has a 6 pin connector, and the mouse has a 5 pin connector. The extra pin is for the second button. Get a momentary contact pushbutton switch and wire it (on the B side connector) from the trace going to the center pin of the interface connector to the ground rail (horizontally next to it). When you boot your Tech Draw software, press the button and you are off and running!

I must add that using the mouse does indeed make Tech Draw an outstanding program and at the top of a Must Have list.

Dear Editor, My 1500 is inoperative. There are cracks in the ribbon cable coming from the keyboard. How can I fix it?

Thomas Griffin, 1431 Powderhorn Dr., Phoenixville, PA 19460.

You like to open your case. This is a common symptom of Sinclairitis. There are conductive epoxies available. Look in the business yellow pages under plastics suppliers for a distributor near you. However, I suggest that you cut off the bad part of the ribbon. If it is too short to reinstall in your PC board, then unsolder the ribbon connectors from the board and glue them to the top half of the case. Then run wire wrap wires from the connector to the appropriate pin on the PC board.

Dear Editor, I have enclosed a few more changes that fix a few more bugs in the 2068 system. I am interested in hearing from others who may have some changes to incorporate. I am also collecting fixes for the EXROM as well. For those interested, I will supply programmed eproms for a nominal fee.

Bob Orrfelt, 3436 Bay Rd., Redwood City, CA 94063

Proposed T/5 2068
Home ROM fixes. Oct. 85

Fix for Oliger EPROM programmer.
(see May 85 Synware, page 14)
002B 84 DB 84H
002C 87 DB 87H
002D 88 DB 88H
002E 8D DB 8DH
002F 92 DB 92H

NMI fix.
006D 2801 JR Z,0070H

DELETE delay timing.
0351 010100 LD BC,0001H
0354 05 DEC BC
0355 79 LD A,C
0356 B0 OR B
0357 20FB JR NZ,0354H
0359 F1 POP AF
035A 18D2 JR 032EH

Optional turn on message.
(Last character add 80H)
1118 Property of Bob
1128 Orrfelt.....
1138
1148 ..

INT -65536 etc. errors.
33F1 F5 PUSH AF
33F2 30 INC A
33F3 B0 OR B
33F4 B2 OR D
33F5 C2E435 JP NZ,35E4H
33F8 C3EF35 JP 35EFH

35E2 181A JR 35FEH
35E4 F1 POP AF
35E5 77 LD (HL),A
35E6 23 INC HL
35E7 73 LD (HL),E
35E8 23 INC HL
35E9 7D LD (HL),D
35EA 28 DEC HL
35EB 28 DEC HL
35EC 28 DEC HL
35ED D1 POP DE
35EE C9 RET

35EF F1 POP AF
35F0 28 DEC HL
35F1 3891 LD (HL),91H
35F3 23 INC HL
35F4 3880 LD (HL),80H
35F6 30 INC A
35F7 18ED JR 35E6H

35F9 FFFFFFFF blanks
35FD FF

More for EPROM programmer.
37B8 D9 EXX
37B9 212B00 LD HL,002BH
37BC 85 ADD A,L
37BD 6F LD L,A
37BE 6E LD L,(HL)
37BF 2636 LD H,36H

37C1 D9 EXX
37C2 AF XOR A
37C3 C9 RET
37C4 00 NOP

USR chunk selection.
389F E650 AND 50H
38A1 281B JR Z,38BEH
38A3 D640 SUB A,40H
38A5 FAB738 JP M,38B7H

Dear Editor, Could you list the various monitors that will work with a 2068. I got a Commodore monitor and could not get it to work.

Dennis Sylvestri, 256 Lloyd St., New Haven, CT 06513

Any composite monitor will work with the 2068. The Commodore monitor just has a different connector (it also has sound input in the back). You need only find the right combination of video input and ground in order to get the picture. Radio Shack should have all of the different combinations of possible connectors that might come up. Commodore has a habit of creating non

standard connectors. They probably took lessons from Sinclair. RGB monitors will require an interface. There is still a background noise associated with the 2068 when it is used on a monitor, although the picture is considerably improved. RGB monitors don't have this problem. You too may need to open your case and tweak the adjustments.

Dear Editor, Do you know of any of the following items for the 2068. 1. Extra memory. 2. A clock chip for starting a program at a predetermined time. 3. A portable power supply. 4. A way to get the true colors out of the 2068. 5. A battery operated daisy wheel printer.

Pete Kelly, RT 5 Box 150, Hattiesburg, MS 39401

Since you are a new subscriber, I should start by saying that you need a few back issues, if for nothing more than the Support column. Extra memory has been addressed at great length. See this support column for Steve Wyatt's Real time clock board. Games To Learn By has a case that can include everything for making your 2068 portable and usable. For true colors (since I don't know how bad your colors are), the best solution is an RGB output, which is available from Aerco, John Oliger and several other distributors. Your colors may only need adjusting, which requires opening the case. You should write to and request catalogs from everyone supplying Sinclair software and peripherals. SWN uses an F10 Starwriter, which weighs in at about 50 lbs. It's not movable let alone portable. The power required to drive the mechanisms on battery power would call for a battery so large that it still wouldn't be portable, even if the F10 was much smaller. There are some near letter quality printers that might fit your bill nicely though. All of the portables leave something to be desired when it comes to quality letters. This subject I will leave to the philosophers. Pick your printer and get the appropriate interface (parallel or serial) from your favorite source. Many package deals are available. Check around.

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2K EPROM (8 routines)	\$18.50
4K EPROM (15 routines)	\$25.00

Delphic Enterprises
P.O. Box 72205
Corpus Christi, TX 78472

BECOME A SINCLAIR TYCOON

(Vendor and Software/Hardware Producers Guide)

Jack Dohany
325 O'Connor Street
Menlo Park, CA 94025

This paper is the result of much research among the wretched rank and file of T/S users, to discover the things that irk, confuse and disappoint them most about the products they buy for their computers. It is hoped that this paper will provide new insight into the ways and means of reducing your business's profit, thereby enhancing its value as a tax writeoff.

Of course, a measure of caution should be used in applying the principles and measures described herein, lest you go out of business entirely, leaving the field open to those few miserable vendors who insist on providing user-friendly goods, services and support.

Closed Architecture

A closed mind is a great aid to designing closed architecture into your software and/or hardware and documentation.

The basic idea here is to PREVENT the user from using your product in any other way than the narrow and limited way in which you designed it to be used. Closed architecture also helps to keep your product incompatible with other products. This ensures that your product will have a narrow, limited market and a brief life.

Software

DO NOT provide a return to BASIC from MC.

DO NOT make source code available.

DO NOT answer any questions about your software.

Ideally the user should be kept totally in the dark about what he has bought from you, so that the product cannot possibly be modified or improved or put to other uses. The mere existence of such improvements would surely increase the marketability of your product, which is to be avoided at all costs.

The "BREAK" problem, or what your software should do when the user attempts to use the "BREAK" key: There are only three possibilities, listed in order of preference.

1: CRASH. This teaches the users a good lesson, and prevents them from ever buying your products again. Clearly the best.

2. Print the words "Naughty, Naughty, Naughty" on the screen in big flashing letters. This tells the users you are NOT to be trifled with, and impresses them with your software know-how. The danger with this choice is the semblance of HUMOR, a definite no-no. Crashing is better.

3. Simply ignore the user. This has the advantage of being mildly infuriating or boring. At least, it does prevent the more ignorant users from fiddling with your software or adapting it to work with their own brand of mass-storage device, thereby forcing them to stick with cassette, which is maddeningly slow and unpredictable. (That is to say, ideal.)

Hardware

DO NOT provide schematics. These would be an open invitation to the user to improve your product, fix it if it breaks, or put it to (shudder) OTHER USES!

DO grind the part numbers off as many parts as possible, and paint the rest purple.

(An aside: I simply cannot understand why automobile manufacturers do not weld the hoods shut. The fools provide schematics, parts lists and all sorts of information in something they call "shop manuals," which they will even sell to USERS!! Worse, their user-documentation provided with the car is often large, informative and LEGIBLE! No wonder they are showing a profit!

What do you do if a user calls you up and tells you about a "wonderful" new use he has found for your product? Here there is only ONE choice: scream at him in a childish fit of rage, and slam the receiver down. This will surely end the user's enthusiasm for "new uses." Furthermore, news of your response will spread far and wide, providing the best kind of adverse publicity: word of mouth.

If you have been so wise as to provide such a response, DO NOT weaken or call the user back to

apologise. This would UNDO all your good work, and would surely once again encourage enthusiasm.

Documentation

This should be as small, illegible and unhelpful as possible. Be stern, give dire warnings and be intimidating.

Spelling and grammar errors seem to be much in vogue as a way of unfavorably impressing user's. However, our research indicates that most users do not even notice such things, so that they are not worth the effort.

Try your best to make the documentation uncopyable. Blue ink on black paper is very, very good. (Same applies to Basic programs.) Remember that IF the users can copy your documentation, they are likely to pass out copies to interested parties at meetings, who are then likely to be impressed and send you unwanted ORDERS!

DO NOT release your software without a good number of problems or deficiencies. DO NOT mention them in the documentation, despite your natural tendency to do so. There are many users who for some reason are FAVORABLY impressed by honesty.

The general rules for documentation are the same as those for dealing with users in person or on the phone: scrupulously AVOID forthrightness, sincerity, humor and humanity. Always remember that "shared laughter" and "good vibes" are treacherous to your bad-business goals, and will ultimately cause you big problems with the IRS owing to drastically increased income.

Timex / Sinclair Owners... **TAKE A LOOK!**

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ONE CHIP MODS

We've published several "one-chip mods" in past issues; one added chip allows your ZX81/TS1000 to run machine-code in high memory, one chip decodes the TS2068 EXROM bank. One single TTL chip can greatly expand your machine's capabilities with little effort; for this reason, we're starting a semi-regular column called "ONE-CHIP MODS," dedicated (you guessed it) to those simple but powerful additions.

Fred Nachbaur

Decoding Your Byte Back

If you have a Byte-Back RS232 interface, MD-2 modem, or BB-1 control module, you probably know that these devices are memory-mapped at 16382 (3FFEh) and 16383 (3FFFh). This is at the top of the "user-RAM" space from 8-16K, which is very useful for storing and running machine-code, and for storing BASIC and data.

Unfortunately, these two memory addresses are not fully decoded, so with some RAMs you might find that the ports don't work if this region of RAM is enabled. The good news is that one IC can be wired into these Byte-Back devices to effectively isolate the port addresses from the RAM. You'll therefore be able to use your Byte-Back device with the full 8-16K range enabled, regardless of which particular 64K pack you happen to have.

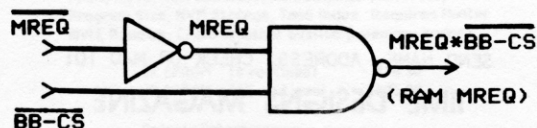
Theory

Byte-Back's memory mapped devices have full decoding for the two port addresses, but the decoding is not passed on to MREQ NOT. As a result, when these addresses are paged, both the Byte-Back device and the RAM (or NVM) are energized. With some RAMs (Memotech, JLO, Hunter board) the signal from (or to) the Byte-Back overrides the signal generated by the RAM. In these cases, there's no problem. Some other RAMs, however, override the port module. The result is that addressing the ports has no (or the wrong) effect.

By using the decoding already included on the Byte-Back board to disable MREQ NOT, any possible conflicts are prevented. This is as simple as NANDing MREQ (inverted MREQ NOT) and BB-CS NOT (Byte-Back chip select NOT) to give (MREQ AND BB-CS NOT) NOT, or RAM MREQ NOT. Thereby, when the port addresses are paged (BB-CS NOT goes low), the MREQ NOT line to the RAM is inhibited (remains high).

Figure 1 shows a functional diagram.

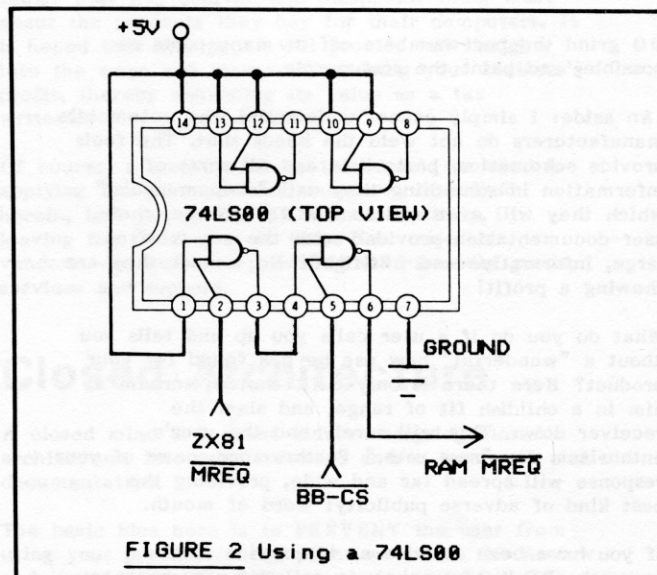
FIGURE 1



FUNCTIONAL AND LOGIC DIAGRAM

How to Do it

Start by disconnecting the edge-conductor MREQ NOT pin from the "finger board" extension on the Byte-Back board. This is pin 14A, the 11th pin from the slot on the top side. Clip it off or bend it upward to prevent accidental contact with the finger-board. Wire up a 74LS00 (Fig. 2) or 74LS10 (Figure 3) and mount it at a convenient place near the 74LS133 13-input NAND gate. The MREQ NOT input goes to the MREQ NOT edge connector line (to computer), and the RAM MREQ NOT output goes to the MREQ NOT finger-board trace (to RAM).



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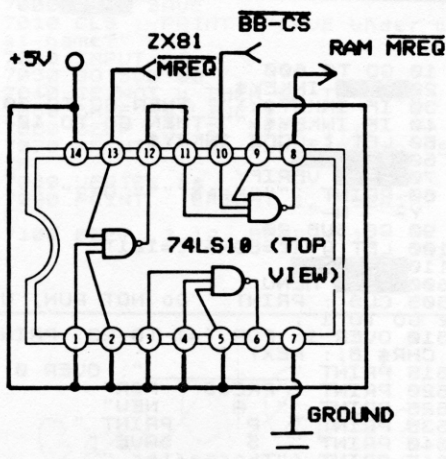


FIGURE 3 Using a 74LS10

The BB-CS NOT input goes to the output of the on-board decoding circuit. On the MD-2 modem and the RS232 IF, this is pin 11 of the 8251 USART chip (IC8 on the modem). On the BB-1 module, this point is at pin 12 of IC4 (74LS27), or at pin 13 of IC2.

Then, all that remains is the +5V and ground connections, which can be picked up at the nearest convenient point.

Test it

Hook up your system, with the Byte-Back device BEFORE the RAM or NVM. (If you place the RAM first, the whole purpose of this exercise will be defeated.) Try addressing the memory-mapped I/O ports with simple PEEKs and POKEs; the device should work even though RAM is enabled in the 8-16K range. Now try POKeIng and PEEKIng other addresses between 8192 and 16381. If you get back the same number you POKEd, without interfering with the port module, then all is well. You have just regained your 8K (less two bytes) of user-transparent RAM.

★COMING SOON- recycle that 16K RAM pack to give you two banks of 8-16K memory in the next ONE-CHIP MODS.

MEGABASIC MAGIC

Available for \$12.95 from:
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YS Megabasic is an extended version of standard Spectrum basic, adding some 60 new commands. YS stands for 'Your Spectrum,' the British magazine from which the program originates. The cassette tape comes with a 30 page manual plus a sheet of instructions to upgrade version 1.0 on the cassette tape to version 3.0. The upgrading involves typing in about 60 lines of code. This is necessary as version 1.0 will crash using some megabasic commands. My upgraded program worked first time, and no crashes have occurred using this version with a Romswitch or emulator. Megabasic 3.0 may be saved to tape, but it also includes a Microdrive save option. My version is saved on a Microdrive cartridge.

The first and most obvious difference that you will notice when Megabasic is loaded is that the Sinclair keyword system is not utilized. All keys now give single characters, similar to many other computers, and commands need to be typed out using single letters. I like having my TS2068 behave as a 'normal' computer, but some of you may consider this a disadvantage. However, YS Megabasic does allow about 50 common keywords to be abbreviated by one to three letters followed by a period (e.g., PRINT may be PR.; NOT, N.; and CONTINUE, CON.)

Since sixty new commands are added to basic by Megabasic, it is not possible in a short review to discuss every new command, but a selection of the ones that I have found to be most interesting are listed here.

AUTO causes a line number to be generated before each line. This is very useful when typing in a long program.

WINDOW defines the size and position of the current window. Up to ten windows may be defined, and each window can be of any size up to the whole screen

area and take up any position on the screen. Program input and output may use any of the defined windows.

PAN and SCROLL commands can be used to make a window scroll up, down, left and right.

MODE can make use of the 64 column facility of Megabasic. Using the MODE command the 64 column characters may be accessed as well as normal size 32 column characters, double height 32 column characters and double height double width 16 column characters. Each WINDOW can have its own character MODE. 16 column characters may be shaded by means of a STIPPLE command.

FONT gives access to three character sets. The default character set simulates that on the Amstrad CP464. The other character sets available are the standard Spectrum set and a set similar to that used on the BBC micro. I much prefer the Amstrad character set to the normal Spectrum/2068 set.

SOUND and its associated SOFF, SON and SREP commands allow various sounds to be produced, while a program is running, via the the interrupt sound generator.

SPRINT enables a string of characters to be placed on the screen magnified any amount in the X or Y direction.

These are only a small selection of the new Megabasic commands. The uses of Megabasic are limited only by your imagination. I have so far used the SPRINT routine for producing posters on my 80 column printer and an MTASK command to run two programs at the same time with each one sending its output to a different window. I understand that Your Spectrum magazine is now publishing programs in Megabasic.

Reviewed by:
Tony Brooks

CURVE TRACING-2068

Basil Wentworth
1413 Elliston Drive
Bloomington, IN 47401

Here's a little program that will let you use the TS 2068 to print mathematical curves, handwriting, doodles, or what-have-you.

All you do is draw (or write) the desired copy on your monitor screen, and then use the program to approximate the picture with a series of line segments. Use a grease pencil or a felt-tipped pen to draw the picture on the screen, and be sure that you don't let the line go outside the limits of the display. A good way to make sure that your picture stays in bounds is to use a BORDER of contrasting color while you are drawing it in.

GO TO 1 gives you the MENU, with options NEW, PRINT, and SAVE. In case you didn't recognize the fact at once, the keys used for these respective choices are the ones that bear the corresponding keywords. When you have made your selection, you confirm it by pressing Y (or y), or give yourself another chance by pressing any other key.

The choice of SAVE puts you into a SAVE-VERIFY routine, in which you choose the name under which you want to SAVE the program, and the rest is fairly automatic.

PRINT prints out any picture that you already have in the memory.

```

10 GO TO 600
20 REM INKEY$
30 IF INKEY$<>"" THEN GO TO 30
40 IF INKEY$="" THEN GO TO 40
50 LET c=CODE INKEY$
60 REM
70 VERIFY
80 PRINT "*****a$;"" OK?""
Y- N-
90 GO SUB 20
100 LET y=(c=89)+(c=121)
110 REM
120 MENU
605 CLS : PRINT "DO NOT RUN; U
se GO TO 1";
610 OVER 1: FOR f=1 TO 23: PRIN
T CHR$ 8;: NEXT f
615 PRINT "OVER 0
620 PRINT "PRESS FOR"
625 PRINT "A NEW"
635 PRINT "P PRINT"
640 PRINT "S SAVE"
645 PRINT "Thereafter,"
650 PRINT "Shifted "1" give
s MENU"
660 PRINT "SYMBOL SHIFT ""Q""
gives PLOT"
670 PRINT "SYMBOL SHIFT ""W""
gives DRAW"
680 PRINT "To move in directio
n of arrow,"
690 PRINT "S-8 gives 1 space"
700 PRINT """ With CAPS SHIFT
, 5 spaces"
710 PRINT """ With SYMBOL SHI
FT, 10 spaces"
720 GO SUB 20
730 IF c>90 THEN LET c=c-32
740 LET a$=CHR$ c
750 GO SUB 80
760 IF NOT y THEN GO TO 600
770 IF a$="S" THEN GO TO 7000
780 IF a$<>"A" THEN GO TO 1000
790 LET i$="P": LET s$=""
800 LET h$="" LET v$=""
1000 REM PRINT
1005 CLS
1010 FOR f=1 TO LEN h$
1015 IF i$(f)<>"P" THEN GO TO 12
00
1020 PLOT CODE h$(f),CODE v$(f)
1030 GO TO 1300
1210 IF CODE s$(f)=0 THEN DRAW C
ODE h$(f),CODE v$(f)
1220 IF CODE s$(f)=1 THEN DRAW -
CODE h$(f),CODE v$(f)
1230 IF CODE s$(f)=5 THEN DRAW C
ODE h$(f),-CODE v$(f)
1240 IF CODE s$(f)=6 THEN DRAW -
CODE h$(f),-CODE v$(f)
1300 NEXT f
1350 IF a$="P" THEN STOP
1500 LET h=0: LET v=0
1510 LET dh=0: LET dv=0
1520 LET p=(i$(LEN i$)="P")
1540 IF p THEN PLOT dh,dv
1550 IF NOT p THEN DRAW dh,dv
1560 GO SUB 20
1570 IF c=226 THEN GO TO 2000
1580 IF c=7 THEN GO TO 600
1590 IF c=199 OR c=201 THEN GO T
O 2000
1600 OVER 1
1610 IF p THEN PLOT dh,dv
1620 IF NOT p THEN PLOT h,v: DRA
W dh,dv: PLOT h,v
1625 OVER 0
1630 LET dh=dh+(c=56)-(c=53)+5*(
(c=9)-(c=8))+10*((c=40)-(c=37))
1640 LET dv=dv+(c=55)-(c=54)+5*(
(c=11)-(c=10))+10*((c=39)-(c=38)
)
1650 IF h+dh<0 THEN LET dh=-h
1660 IF v+dv<0 THEN LET dv=-v
1670 IF h+dh>255 THEN LET dh=255
-h
1680 IF v+dv>175 THEN LET dv=175
-v
1690 GO TO 1520
2000 LET s$=s$+CHR$ ((dh<0)+5*(d
v<0))
2010 LET h$=h$+CHR$ ABS dh
2020 LET v$=v$+CHR$ ABS dv
2030 LET h=h+dh: LET v=v+dv
2040 IF c<>201 THEN LET v=0: LET
h=0
2050 IF c=201 THEN LET i$=i$+"D"

```

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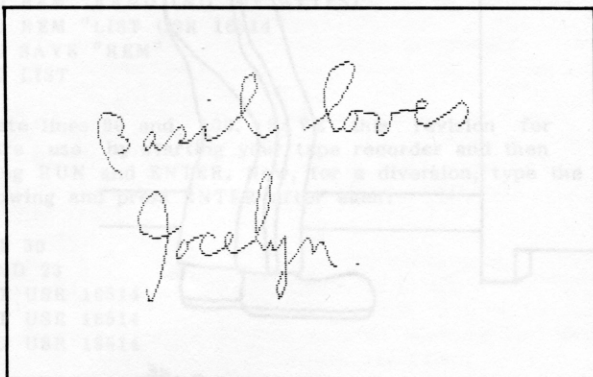
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```

2050 IF C=199 THEN LET I$=I$+"P"
2070 IF C=225 THEN STOP
2100 GO TO 1510
6999 STOP
7000 REM SAVE
7010 CLS: PRINT "SAVE under wh
at name?"
7020 INPUT A$
7030 GO SUB 80
7040 IF NOT Y THEN GO TO 7010
7050 SAVE A$ LINE 1
7060 BEEP .3,12: BEEP 1,12
7070 PRINT "Re-run tape to VER
IFY"
7080 VERIFY A$
7090 PRINT "BRIGHT 1;" VERIFY 0
K"
7100 BEEP .3,12: BEEP 1,12

```



If you choose NEW, the program starts in PLOT mode, letting you PLOT the first location of your "pencil". The arrow keys 5-8 are used to position your "pencil", with the unshifted key moving one space in the indicated direction, the CAPS SHIFTed key moving 5 spaces, and the SYMBOL SHIFTed key moving 10 spaces.

When you have moved the spot to where you want it, "freeze" it by pressing either "Q" (for PLOT) or "W" (for DRAW), along with the SYMBOL SHIFT. If you choose PLOT, then the procedure will be repeated. If you choose DRAW, then the line will start from the last PLOT position, going as far as you choose, in the direction you choose, according to your use of the arrow keys and the SHIFT keys. When you want to lift up the "pencil" and start from a new position, make the PLOT choice again. STOP will stop the program, and you can return to the MENU at any time by shifted 1 (EDIT).

Since the co-ordinates you can use for PLOT and DRAW are limited to the range 0-255, the value of each move can be stored as its CHR\$ in h\$ and v\$, while i\$ keeps a record of whether each move is a PLOT or a DRAW. S\$ is used to tell the computer whether the respective values of h\$ and v\$ are to be construed as positive or negative. (They can be negative in the case of DRAW.) But don't try to PRINT the various strings--you are very likely to run into some unprintable characters, giving you an error message of "K Invalid color".

A TS1000 REM GENERATOR

Chuck Peterson
Box 98
Alcester, SD 57001-0098

REM lines are often used to store machine code in the ZX81 and TS1000/1500 computer. A few months ago I needed a REM line with 600 spaces in it. Rather than type it in by hand, I developed a machine-code routine to make it. The routine will generate a REM line of any length and insert it anywhere in a program listing. It is relocatable. The line thus generated can be used to hold your machine code, to make space for program merging, or to hold data.

To begin with, enter a program for loading machine code:

```

1 REM 12345678901234567890123
45678901234567890123456789012345
67890123
10 REM REM GENERATOR
20 REM CHUCK PETERSON
30 DIM A$(4)
40 FOR F=16514 TO 16576
50 INPUT A$
60 POKE F, VAL A$
70 PRINT A$;
80 NEXT F
90 POKE 16510,0
100 STOP

```

The POKE in line 90 changes the number of the first line from 1 to 0.

RUN the program. When the cursor (in quotes) appears, enter the following numbers one at a time. Go from left to right and top to bottom.

```

205 35 15 42 10 64 229 205
216 9 43 237 75 50 64 3
3 197 3 3 3 3 205 158
9 193 209 35 35 114 35 115
35 113 35 112 35 54 234 11
11 35 54 27 120 177 32 248
54 117 52 42 12 64 34 41
64 213 205 43 15 193 201

```

The program will stop with a 9/100 report at the bottom of the screen. Check the numbers on the screen against the above listing. If all is well, try out the routine. Assume a for a moment that a line, 25 REM, is needed which is to have 119 spaces (bytes) in it. In the immediate mode, type the following, pressing ENTER after each:

```

25
RAND 119
LIST USR 16514

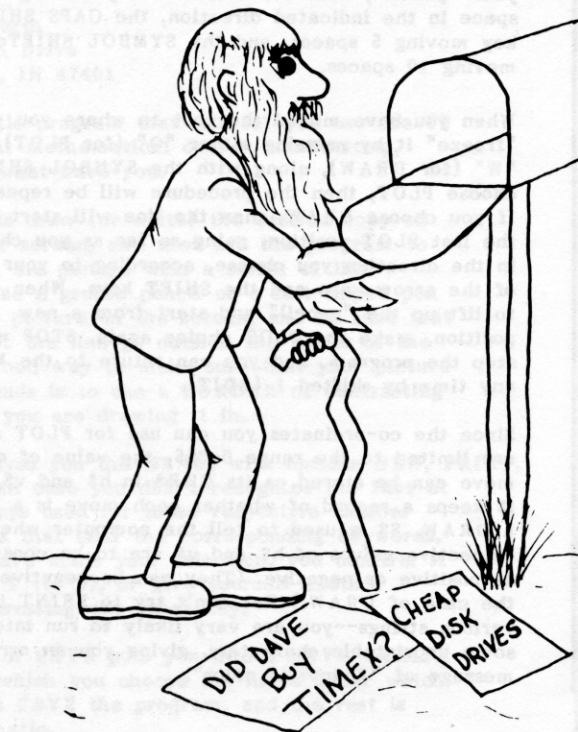
```

The routine will insert line 25 REM into the program and LIST it. This line can be edited and deleted like any other line.

Now for a warning: don't try to generate a long REM line just yet. We'll get to that later.

Whatever can go wrong, will go wrong. So, it is advisable at this point to save the program. Delete line 25, then start your recorder and enter SAVE "REM".

**Don't grow old waiting
for all those Timex
rumors to come true.**



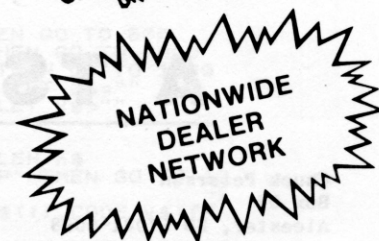
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You can change the character that fills the REM line. Address 16557 holds the character code. It now holds 27, which gets printed as a period. For machine code work, 0's (NOP or "no operation") are better, as are 201's (RETURN). To change to 0's, for example, type POKE 16557,0 and press ENTER. Call for a REM line and it will be filled with zeros, which are printed as spaces.

For the sake of shortness and simplicity, the routine was written without prompts. It will be easy to forget how to use it. To preserve your own sanity, add the following lines:

```
30 REM USE IN IMMEDIATE MODE:
40 REM "(LINE NO.)"
50 REM "RAND (NO. OF BYTES)"
60 REM "LIST USR 16514"
70 SAVE "REM"
80 LIST
```

Delete lines 90 and 100. SAVE this revision for future use by starting your tape recorder and then typing RUN and ENTER. Now, for a diversion, type the following and press ENTER after each:

```
LIST 30
RAND 23
LIST USR 16514
LIST USR 16514
LIST USR 16514
```

Delete line 30 three times in a row!

Generated REM lines, especially long ones, can cause big trouble. If you haven't saved the routine, do it now. Let's make trouble. Generate a REM line whose line number is 9998, making it 1000 bytes long. Then add the following line:

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9999 PRINT

Get ready to pull the plug. Delete line 9999. The computer will unsuccessfully try to list line 9998 and the keyboard will not respond to BREAK. The computer is locked up and the only way to continue is to reset or pull the plug, losing the program. This same lock-up occurs occasionally if the generated REM line is the only or last line of a program.

To avoid catastrophe, always make sure that there is another line, with a higher line number, after your generated REM. If there is none, add one. It can be a short REM line. The added line can be edited or replaced, but never delete it.

[Editor's note: You can delete a short line after a long REM if you POKE the first two locations of the REM with 118, thus fooling the LIST routine into thinking that the end of the display file has been reached. After deleting the short line, POKE the original values back in. For example, for a 1 REM, POKE 16514 and 16515 with 118, delete the short line (e.g., 2), then POKE 16514 and 16515 with 27 (or the original values). -tb]

Put It Anywhere

REM Generator can be relocated. If you tried the above experiment, load it back into your computer. Transfer the routine to the 8-16K block, if available. Another place to store it is above RAMTOP. The following is one way to transfer it there. Add to lines 0, 10 and 20:

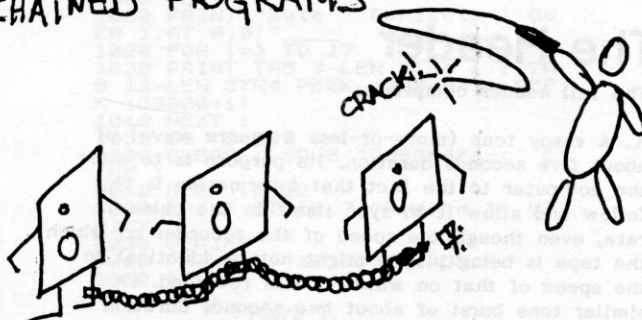
```
30 SAVE "REM"
40 POKE 16388,88
50 POKE 16389,127
60 FOR F=16514 TO 16576
70 POKE F+16086,PEEK F
80 NEXT F
90 NEW
```

The program resets RAMTOP to 32600. To use it, start your recorder and RUN the program. Your computer will first save it, then reset RAMTOP, transfer the routine and execute NEW. When the cursor returns to the screen, generate a REM line as before with one exception; for the final command use LIST USR 32600

With the machine code relocated I have been able to generate a REM line which is 15000 bytes long! Don't worry about asking for too many bytes. If you specify too many, the screen comes back blank with a report code 4/0 (out of memory). The computer will be in FAST mode, and your program will not have been affected.

As with all routines, the best way to learn more about the REM generator is to play with it. So go at it!

CHAINED PROGRAMS



[illegible]

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This is a totally new sales concept for MAXSOFT, and so we are currently setting a January 31, 1986 cut-off date. We may extend that date if possible, but will not promise, so as not to disappoint anyone. Write if in doubt.

NAME	LIST/INSTR	N/CASS	DESCRIPTION
SUPER-SCREEN 1000/1500	\$5	\$9	Req 16K. Allows BASIC program to SCROLL or CLS only a "window", a portion of the screen leaving other things that you want to stay (scores, instructions, etc).
SUPER-SCREEN 2068	\$5	\$9	COMING SOON!! Same as S-SCREEN 1000 except relocatable to anywhere in RAM. Use from BASIC or M/Code.
MAX-DIS 2068	\$5	\$9	Disassembler written in BASIC with a clean, structured style. Fast for a BASIC routine. Neat printer format allowing comments, etc, on the 2040 printer. Great alone or merge w/JRC compiler. Super Combo.
MATH-MASTER	\$4	\$7	Great math skills test for young and old. Three levels of play. +, -, x and /. Specify 1000/1500 (2K or more) or 2068
SCRAMBLE-BUG	\$4	\$7	Delightful word game. One player inputs a word at their own level, computer scrambles it, and player 2 guesses it. Very enjoyable family or party fun. Specify 1000/1500 (16K) or 2068.
BEAT-THE-SYSTEM	\$4	\$7	Player against computer in this one. Guess the random number selected by computer. Very challenging. Not as easy as it sounds. Specify 1000/1500 (16K), or 2068.

READ A 2068 HEADER

Normal TS 2068 cassette-tape information consists of two parts, a header and a data block. The data block follows the header and contains the information itself. The header's function is to provide the appropriate parameters to the computer so that it will know such things as the purpose of the data to follow, what space should be reserved for it, and what action should be taken with it. These facts are generated within the computer when the information is SAVED and used to form the header. Upon LOADING, these facts are returned to the computer first to prepare it to receive the data block. It is the purpose of this article to examine the make-up of the header and provide a means by which a header can be read and the bytes therein interpreted.

The full header comprises:

B. The header itself, containing a total of nineteen bytes. The first and last of these bytes are common to all headers (and data blocks), are not stored by the computer after their use and are not normally counted when describing the length of a header (or a data block). But they are there. Briefly, they are:

Byte 0 is a flag that tells the computer what is to follow. 0 is for a header, and 255 (FFh) is for a data block.

Byte 18 (Last, or nineteenth byte) is the Parity byte. This is built up during SAVE by giving it an initial value equal to the flag byte, then exclusive OR'ing every byte with the current parity byte, including a last exclusive OR with itself. This process results in a final parity byte which is equal to the flag byte. A similar process takes place upon LOADING. If the parity byte is not equal to the flag byte upon completion of LOADING, a tape loading error results.

These bytes will not be considered further, because the main interest is in the contents of the body of the header.

14

bytes will be referred to as Bytes 1 through 17. They provide the following information:

BYTE #1 is the Data Block type.

- 0 = BASIC Program.
- 1 = Numeric Array.
- 2 = Character Array.
- 3 = Machine Code or Screen.

BYTES #2 through #11 contain the File Name, which is 10 characters long. Spaces are used to fill out the name until it is 10 characters long. The name may be only spaces.

BYTES #12 & #13 are the length of the Data Block. As mentioned above, this is the length without the file and parity bytes. The entire data block is actually two bytes longer.

BYTES #14 & #15 are the Function (depends on Type):

BASIC Program- Number specified in LINE when SAVED for auto-start. If there is no auto-start, then Byte 15 is 128 (80h).

Numeric Array- Byte 14 = 0. Byte 15 contains the code of the name of the array plus 64 (40h).

Character Array- Byte 14 = 0. Byte 15 contains the code of the name of the array plus 128 (80h).

For example, in numeric and character arrays the computer always assumes that the name of the array is upper-case (as with any variable). Therefore the code used is the code of the upper-case letter. E.g.: Say the name of the array is "G" or "g" (or "G\$" or "g\$" for a character array). The code of "G" is 71 (47h). Byte 15 will then contain 135 (87h) for a numeric array and 199 (C7h) for a character array.

Machine Code- Starting address of the block of bytes from which the data block was SAVED. For a SCREEN\$ SAVE this will always be 16384 (4000h).

BYTE #16 & #17 are only used for BASIC Programs. They give the length of the Program part of the file. Recalling that a BASIC Program file saves both the program and the Variables area, one can see that subtracting the length of the Program from the overall length of the file given by bytes 12 and 13 will result in the length of the Variables area.

For arrays and machine code Byte 16 is 0 and Byte 17 is 128 (80h).

If these 17 bytes could be loaded into a specified section of memory, then they could be examined using PEEK commands and interpreted in accordance with the information just given. This is indeed the case.

Reading it

In the 2068 computer, the tape LOAD routine resides in the EXROM. It will LOAD the number of bytes specified by the contents of the Z-80's DE register into a block of memory whose starting address is given by the contents of the IX register.

A short (44-byte) machine-code program has been written to set these registers to the desired values, transfer to the EXROM, call the LOAD routine and return to the Home ROM and the BASIC program. Transfer to and from the EXROM is accomplished with an adaptation of the listing given in Figure 3.2.2-2 on page 80 of the 2068 Technical Manual. 30000

```

5 REM "2068hdrdr"- 2068 Head
re Reader.
7 REM 29 Jun 85
10 BORDER 0: PAPER 0: INK 6: C
LEAR 29956
20 RESTORE
30 FOR a=29957 TO 30000
40 READ c
50 POKE a,c
60 NEXT a
100 DATA 175,55,221,33,49,117,1
7,17,0,243
110 DATA 245,219,255,203,255,21
1,255,219,244,50
120 DATA 48,117,62,1,211,244,24
1,205,252,0
130 DATA 58,48,117,211,244,219,
255,203,191,211
140 DATA 255,251,201,0
150 FOR i=0 TO 6
160 POKE USR "a"+i,0
170 NEXT i
180 POKE USR "a"+7,126
190 POKE 30001,4
200 CLEAR
210 PRINT AT 10,8;"Start the ta
pe-"
220 RANDOMIZE USR 29957
230 CLS
300 LET type=PEEK 30001
310 IF type>3 THEN PRINT AT 10,
9: FLASH 1;" Not a Header ": GO
TO 700
320 LET a$=""
330 FOR i=0 TO 9
340 LET a$=a$+CHR$ PEEK (30002+
i)
350 NEXT i
360 LET len=PEEK 30012+256*PEEK
30013
370 LET start=PEEK 30014+256*PE
EK 30015
380 LET pa=PEEK 30016+256*PEEK
30017
390 LET var=len-pa
400 PRINT "Name: ";
410 IF type=1 THEN GO TO 500
420 PRINT "Program type: BASIC."
430 PRINT "Program area: ";pa;"
bytes."
440 PRINT "Variables area: ";va
r;" bytes."
450 IF start>9999 THEN PRINT "N
o auto-start.": GO TO 600
460 PRINT "Auto-start at Line "
start;"
470 GO TO 600
500 LET t$="Code Block."
510 IF start=16384 AND len=6912
THEN LET t$="Screen."
520 IF type=1 THEN LET t$="Nume
ric Array.": LET n$=CHR$ (PEEK 3
0015-64)+" or "+CHR$ (PEEK 30015
-32)
530 IF type=2 THEN LET t$="Char
acter Array.": LET n$=CHR$ (PEEK
30015-128)+"$ or "+CHR$ (PEEK 3
0015-96)+"$"
540 PRINT "Type: ";t$;"
550 IF type=1 OR type=2 THEN PR
INT "Array Variable Name: ";n$
560 IF type=3 THEN PRINT "Start
ing Address: ";start;"
570 PRINT "Length: ";len;" byte
s."
600 INPUT "Copy (y/n)? ";r$
610 IF r$="Y" OR r$="y" THEN CO
PY
700 INPUT "Read another header
(y/n)? ";r$
710 IF r$="Y" OR r$="y" THEN GO
TO 200
720 STOP
1000 CLS
1010 PRINT "Byte Contents";
1020 FOR i=1 TO 17
1030 PRINT TAB 3-LEN STR$ i;i;TA
B 12-LEN STR$ PEEK (30000+i);PEE
K (30000+i)
1040 NEXT i
1050 GO TO 600
9000 CLEAR : SAVE "2068hdrdr" L
INE 1
9010 BEEP .5,12
9020 PRINT AT 10,7;"Rewind to VE
RIFY"
9030 VERIFY ""
9040 PRINT AT 12,20;"is OK."
9050 STOP

```

Figure 1.

(7530h) has been used as a convenient "base" address, so that Byte 1 of the header is in 30001, Byte 2 in 30002, etc.

This machine-code program is contained in DATA statements in the BASIC program, which obviates loading it separately.

The BASIC program is given in Figure 1. It operates as follows:

Lines 10 - 140 initialize things and load the machine code.

Lines 150 - 180 insert an "underline" character into User-Defined Graphic character "A." This is used in Line 400 to delineate the ten spaces present in the Name of the file in order to assist in the identification of blank spaces in the Name. (The "underline" character on the "0" key is not as good for this purpose because it fills all eight pixels on the bottom line of a character block and does not leave a visible gap between characters.)

Line 190 POKes a value of 4 into the byte of memory which is going to contain the Type information. Since this is a higher value than any Type code, it assists in identifying a non-header (almost always).

Line 200 begins the reading of a header.

Line 220 calls the machine code. This LOADs the header from the tape into the specified memory area, ready to be examined by POKE statements.

Lines 300 - 390 PEEK into the header and place the data therein into BASIC variables. (These variables have been given names such as "start" and "length" in the hope that they will be self-explanatory and aid the user in understanding what is being done.)

Lines 400 - 470 print the name of the file for any Type and also print the remainder of the relevant information for a BASIC Program Type. (The " " in Line 400 is actually Graphics "A.")

Lines 500 - 590 print the remainder of the relevant information for the other Types of files. Note that SAVE "name"SCREEN\$ is the same as SAVE "name"CODE 16384,6912.

Lines 600 - 720 ask whether a hard copy of the header information is desired and whether to STOP or read another header.

Lines 1000 - 1050 print the actual bytes of the header for the curious.

Lines 9000 - 9050 provide a convenient means of SAVEing and VERIFYing the program.

Once the BASIC program in Figure 1 has been typed in, checked carefully, and SAVED, it can be used to read headers. It can be SAVED with a LINE 1 auto-start or not, as desired.

(Note that this program will also read the headers on SPECTRUM tapes. For this purpose, the 2068 should not be in a SPECTRUM mode, but used as a 2068 to perform this function.)

Reading the Header

A. LOAD the BASIC header-reader program. If SAVED with auto-start it will come up running. Otherwise use RUN. The message "Start the tape-" will appear.

B. Rewind and remove the tape on which the header-reader program was SAVED (unless reading its own header). As instructed on the screen, play the header of the tape which is to be read.

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C. The information contained in the header will appear on the screen. Select the "Copy" and "Read another header" options as desired. If the reading of another header is selected, the message "Start the tape-" will again appear. If this is not selected, the program will STOP.

D. Once the program is stopped, the raw data (actual bytes) in the header can be seen by using GO TO 1000 (or RUN 1000). This will wind up with the "Copy" query again and carry on from there.

For those who are interested, a HOT Z disassembly of the machine code is provided in Figure 2. The functions of this code are as follows:

```

ADDR  HEXCODE LABEL  MNEMONIC
=====
7505  AF          XOR A
7506  37          SCF
7507  DD213175     LD IX,7531
7508  111100     LD DE,0011
7509  F3          DI
750A  F9          PUSH AF
750B  DBFF       IN A,(FF)
750C  CBFF       SET 7,A
750D  D3FF       OUT (FF),A
750E  DBFF       IN A,(F4)
750F  3B3075     LD (7530),A
7510  3E01       LD A,01
7511  DBFF       OUT (F4),A
7512  F1          POP AF
7513  CDFC00     CALL 00FC
7514  3A3075     LD A,(7530)
7515  D3FF       OUT (F4),A
7516  DBFF       IN A,(FF)
7517  C8FF       RES 7,A
7518  DBFF       OUT (FF),A
7519  EI
751A  RET
751B  00          NOP

```

Figure 2.

Bytes 7505h - 750Dh establish the video mode (0 = Normal) and set up registers IX and DE as explained previously.

Bytes 750Eh - 751Fh activate the EXROM.

Bytes 7520h - 7522h call the tape reading routine in the EXROM.

Bytes 7523h - 752Eh return to the Home ROM.

Byte 752Fh returns to BASIC.

Byte 7530h is a temporary store used by the routines which activate and return from the EXROM. It preserves the data in the horizontal select register while the EXROM is in use.

4. "HEADERLESS" TAPES. These sometimes contain the header information in the first 17 bytes of the data block (remember that the first (flag) byte doesn't count). If so, they can also be read with the header reader.

5. EXAMPLES. Figure 3 gives examples of reading various types of headers. Figure 4, obtained by using GO TO 1000, provides the actual bytes corresponding to the header data in Figure 3.

```

Name: 2068bdcfdd
Program type: BASIC.
Program area: 2269 bytes.
Variables area: 0 bytes.
Auto-start at Line 1.

Name: 2068bdcfdd
Program type: BASIC.
Program area: 1879 bytes.
Variables area: 103 bytes.
No auto-start.

Name: GEE-----
Type: Numeric Array.
Array Variable Name: G or g
Length: 130 bytes.

Name: GEE$IB----
Type: Character Array.
Array Variable Name: G$ or g$
Length: 10 bytes.

Name: Kicstied---
Type: Screen.
Starting Address: 16384
Length: 6912 bytes.

Name: b4ies-----
Type: Code Block.
Starting Address: 26710
Length: 1024 bytes.

```

Figure 3.

Byte	Contents	Byte	Contents	Byte	Contents	Byte	Contents	Byte	Contents	Byte	Contents
1	00	1	00	1	00	1	00	1	00	1	00
2	00	2	00	2	00	2	00	2	00	2	00
3	00	3	00	3	00	3	00	3	00	3	00
4	00	4	00	4	00	4	00	4	00	4	00
5	00	5	00	5	00	5	00	5	00	5	00
6	00	6	00	6	00	6	00	6	00	6	00
7	00	7	00	7	00	7	00	7	00	7	00
8	00	8	00	8	00	8	00	8	00	8	00
9	00	9	00	9	00	9	00	9	00	9	00
10	00	10	00	10	00	10	00	10	00	10	00
11	00	11	00	11	00	11	00	11	00	11	00
12	00	12	00	12	00	12	00	12	00	12	00
13	00	13	00	13	00	13	00	13	00	13	00
14	00	14	00	14	00	14	00	14	00	14	00
15	00	15	00	15	00	15	00	15	00	15	00
16	00	16	00	16	00	16	00	16	00	16	00
17	00	17	00	17	00	17	00	17	00	17	00

Figure 4.

FAST TIMES AT CLAIRMONT HIGH

TS 1000

Stephen J. Jonke
5610 Sharon Dr.
Glen Arm, MD 21057

Walter Wimpily's late for class and the bullies in the science room are trying to prevent him from getting there on time! You must guide Walter down the school hall, past the rocks, radioactive particles, giant mutant frogs and other strange things that the bullies are throwing. Finally you must guide him through the classroom door to safety.

After loading the program from tape, the game starts automatically. You will be prompted for a skill level (1 to 6). The lower the skill number, the faster the game becomes, and the lower on the screen Walter appears (thus giving you less time to react). For choosing a faster skill level you receive a bonus at the end of the first "rack" in proportion to the skill setting. After selecting skill level, there is a short delay, and the game begins.

Walter looks like this  from above (his coat-tails are flying out behind him). The bullies are throwing objects up the hallway (up the screen) towards him. Move Walter left using Z, X, C, or V. Move him right using B, N, M or "." keys.

There are eight racks of 230 obstacles. These obstacles are as follows:

- 1: Crystals from the school's rock collection
- 2: Radioactive particles from the school's nuclear reactor
- 3: Jugs of chemicals
- 4: Giant Mutant Frogs (they've been experimenting with radioactivity on animals!)
- 5: The bullies' test papers, fluttering down the hall
- 6: Giant Mutant Frogs' eggs
- 7: 55 gallon drums of black sticky goop
- 8: Giant Mutant Killer Bees

You score points for passing each obstacle, at the rate of five times the rack number (to a maximum of 40) for each obstacle passed. Once you make it through the 8th rack, you start over with the first rack.

After completing the 4th and 8th racks you must run through a door which appears at the bottom of the screen. When Walter makes it through the door, the skill level advances to the next level and you receive a bonus depending on the number of wimps left.

When running down the hall, Walter can find lost lunch money (which appears as \$). You get a bonus of 1000 times the rack number for picking it up. There are two lunch money bonuses per rack.

Running at such breakneck speeds takes a great deal of energy, so Walter's energy level keeps getting lower and lower, as shown on the food gauge at the lower right-hand corner of the screen. To give Walter extra energy he must pick up "Snuckers" candy bars (inverse F for "food") which he finds on the hallway floor. Running over one of these gives him back 1/3 of his maximum energy. If Walter doesn't pick up any Snuckers bars, he will collapse from exhaustion in about 1-1/2 racks, but there are 7 bars per rack.

If Walter gets knocked down by an obstacle, misses the classroom door, or runs out of Snuckers energy, he will fall flat on his back and all his books will

go flying out of his hands. Walter can stand dropping his books 3 times before he gets frustrated and quits school (ending the game). Like, gag me with a spoon!

Entering the Program

The machine code for the game is held in twenty-two REM statements at the beginning of the program. This makes it comparatively easy to enter the total of 2664 bytes, since you can do it a section at a time and SAVE partial versions when individual sections are complete.

To bring you the entire program in one issue, we are condensing the hex-code listing into lines of 16 bytes per line. Each section in listing 2 contains the code for one of the REM lines. At the top of each section is the REM line number, the total number of bytes, and the starting address of that line.

Start by entering twenty-two REM lines, numbered 1 to 22. The number of spaces after each REM should match the byte count at the top of the corresponding section; so line 1 would have 60 characters, line 2 would have 40 characters, etc. You can verify that you have the right number of characters by entering PRINT PEEK (start address - 1); this should give 234 (the REM token at the beginning of each line).

Listing 1.

```

1 REM TWENTY-TWO REM LINES
  FOR MACHINE-CODE.
22 REM .....
100 SCROLL
105 PRINT "ADDRESS? ";
110 INPUT AD
120 PRINT AD,"BYTES? ";
130 INPUT BY
140 PRINT BY
150 LET C=0
155 LET SUM=0
160 SCROLL
170 INPUT Z$
180 IF LEN Z$>32 THEN GOTO 170
190 PRINT Z$
200 LPRINT Z$
210 FOR N=1 TO LEN Z$-1 STEP 2
220 LET P=CODE Z$(N+1)-28+16*(C
ODE Z$(N)-28)
230 POKE AD,P
240 LET SUM=SUM+P
250 LET AD=AD+1
260 LET C=C+1
270 IF C=BY THEN GOTO 300
280 NEXT N
290 GOTO 160
300 LET Z$="CHECKSUM= "+STR$ SU
M
310 SCROLL
320 PRINT Z$
330 LPRINT Z$
340 POKE 16418,0
350 PRINT "PRESS ""S"" TO SAVE
360 PAUSE 4E4
370 IF INKEY$="S" THEN SAVE "WI
MP$"
```

If you have a TS2040, place it online so you have hardcopy of the hexcode as you enter it. If you have another printer and are using the "UPD" or similar driver, substitute your LPRINT command at line 200. Then enter the hex loader of Listing 1. RUN the program, and enter the start address and number of bytes given for the first REM statement. Then proceed to enter the hexcode a line at a time. Be

careful and take your time; if you make an error you have to redo that REM statement. When the REM has been filled, the program will stop and print the checksum for that REM; this should match the number given at the end of each section of Listing 2. If all went well, you are encouraged to SAVE what you have so far to tape. Then enter RUN again and repeat the process for each of the remaining REM lines.

When you're all done entering the machine-code, enter the BASIC portion of the program shown in Listing 3. Enter RUN 500 to save the completed program to tape. It will subsequently auto-start on loading.

If this is all too much trouble for you, the author will supply a tape of the program for \$9.95. Send your check/MO to the address listed above.

Listing 2.

LINE 1: ADDR.=16514: BYTES=60

```
00000000E0732A1433E0FF32D743210000
223F442241443E0032434400C0DE443E
18323E443E00323844063021A5437723
10F0C3624608080808080808080808
```

CHECKSUM LINE 1 = 3765

LINE 2: ADDR.=16580: BYTES=40

```
0000000000473AD5438000FE00280706
D210FE3D18F5C9000000000000000000
08080808080808080808080808080808
```

CHECKSUM LINE 2 = 1935

LINE 3: ADDR.=16626: BYTES=70

```
CDBB027D2A9F43FE7F2809FEFE281FC9
00000000223237E7E76C82B229F433686
2B3600CD4A442A9F43233606C9002B7E
FE76C8229F43CD4A442A9F4300368623
3606233600C9
```

CHECKSUM LINE 3 = 6453

LINE 4: ADDR.=16702: BYTES=70

```
3A38444F3CE6033238447907814F0600
2A39440901A5433E16323D443A24332
3B44E50A5F030A57037AFE00280D7E12
23133A3B443D323B4420F3E13A3D443D
323D4420D7C9
```

CHECKSUM LINE 4 = 5068

LINE 5: ADDR.=16778: BYTES=229

```
2A0C4011420019545D2AD143373FED52
300621000022D1432AD343373FED5230
0621000022D1432AD343373FED523006
202A0C401122001936002310FB000E15
21A7435E235623E521DFFF19E83A243
477E7E762807360012231310F4E10D20
E2CD3C45CD4A442A9F437FE00C23F43
237FE00C23F4336062B368621D54306
02CD1B4500CD07453AD743FEFCDA8542
3E0032D7433A1433CE60732A143FE02
30073E0132A243180CFE0530043E0218
F33E0318EF3A4244FE403006C052732
42443A143FE00200621D84322394418
0A2A3944110C00192239443AD743FEE6
D29E421806
```

CHECKSUM LINE 5 = 18525

LINE 6: ADDR.=17013: BYTES=100

```
CD56453AA243FE012812FE02280879FE
1ED27542180679FE1FD275422A0C4011
D7021906000922CF433AD7433C32D743
CDAC453AD543CB27C60B473AD743B808
78C6E6473AD743B808181F0000000000
00000000000000000000000000000000
00000000
```

CHECKSUM LINE 6 = 7775

LINE 7: ADDR.=17119: BYTES=90

```
00000000000000000000000000000000
00000000000000000000000000000000
443A4044CE00000000273240443A4144
CE0000273241442A0C40110D0019113F
4406031AE60FC61C771A0F0F0F0FE60F
C61C2B77132B0520EAC9
```

CHECKSUM LINE 7 = 4235

LINE 8: ADDR.=17215: BYTES=90

```
3E0032D7432A9F43E536852336001120
00193601233601118FFF1936042B3681
C150591318163E8002123E02C506FF10
FE3D20F9C10000003E000212130B0AFE
76200301FF001AFE76200311000078FE
0020D37AFE0020CEE1C9
```

CHECKSUM LINE 8 = 7013

LINE 9: ADDR.=17311: BYTES=165

```
7E520001443E00000000000000000000
BF51E851ED5121523E52695282529F52
D052D852FF5218533953725392539A53
D553000000000000000017000017000017
00001700000000000000000000000000
00898A00008800880A89008808008800
06860088050088050002010000850087
040005000010341110341110341110341
11858905858805858A05858005050085
85008500800085000502D84300270017
3500000500
```

CHECKSUM LINE 9 = 8842

LINE 10: ADDR.=17482: BYTES=103

```
2A9F4306027EFA8B20183A3E44C608FE
1938023E18323E44360021000022D143
182AFE0D20263AA1433CCB27CB27CB27
CB274F3A404481273240443A4144CE00
27324144360021000022D3432310B63A
3E44CDB744C908080808080808080808
0808080808080808
```

CHECKSUM LINE 10 = 6845

LINE 11: ADDR.=17591: BYTES=74

```
2A0C40110B0319FE00280FFE01280736
803D3D2318F136053DC97E7E76C83600
C90808080808080821420054D3AD54347
3E0590FE002804193D18F811100019ED
5B0C4019229F43C90808
```

CHECKSUM LINE 11 = 5227

LINE 12: ADDR.=17671: BYTES=73

```
21A543545D2323012A00EDB02B36002B
3600061511DFFF28FE00280C4F2BE5
6E61197C40E17123772B0520EAC90808
08080808082AD143360011DFFF1936AB
2AD343360019360DC9
```

CHECKSUM LINE 12 = 5790

LINE 13: ADDR.=17750: BYTES=80

```
2AA34323545D3E25CB23CB12CB3F3001
19FE0020F32B22A3437C07E61F4F0000
3AD643892011001157002AA343197CE6
1F5700000018D57932D643C908080808
08080808080808080808080808080808
```

CHECKSUM LINE 13 = 5201

LINE 14: ADDR.=17836: BYTES=70

```
FE4D282FFE9A282BE61F20102ACF4322
D14336AB21000022CF430000E0FC03A
3E443D323E44CDB7443A3E44FE00C0E1
C33F432ACF4322D343360D18D7080808
0808080808080808
```

CHECKSUM LINE 14 = 5922

LINE 15: ADDR.=17912: BYTES=100

```
3E4B06FF10FE3D20F9003E80CD15463E
08CD15463E00CD1546C90000002A0C40
11760119160B05060C0E01C5772310FC
2B11210019770D20FBC1C5772B10FC23
11DFFF19770D20FBC104040C0C11DEFF
19C50E0306FF10FE0D20F9C1D115D520
CAD1C91C
```

CHECKSUM LINE 15 = 9012

LINE 16: ADDR.=18018: BYTES=120

```
CD8A41CD3E413E01C0C440C0F240CD3E
413A4143FE0020113AD743FEFC20E13A
4344FE0020DAC34648E603FE0320D13A
D743FEFC20CA3E1532A7432A0C4011D7
021922A543CD564579FE0238F8FE1A30
F432A843CDE0463E04C0C440C0F2403A
A7433D32A74320ECC33F470808080808
0808080808080808
```

CHECKSUM LINE 16 = 12435

LINE 17: ADDR.=18144: BYTES=89

```
2A9F4336002336002AA5430620360023
10FB2AA54311DFFF1922A5433A84306
00B828224F78FE1E793063680230418
F02A9F437FE00C23F433686237FEFE00
C23F433606C9110400194F78C6044779
18CF0808080808080808
```

CHECKSUM LINE 17 = 6925

LINE 18: ADDR.=18239: BYTES=257

```
2A0C4011D50119545D213648010600ED
B0626B06053AA143FE072002061078FE
0520053621231806361D23361C23545D
213C48010400EDB0F5D52A0C4011FF02
197FE86201C2323237FE86200BE136
1F23F14F812781180EE1361E23F18727
1805E1361D23F136142347CB27CB27CB
27CB275778CB3FCB3FCB3FCB3F5F3A40
4482273240443A1448B273241447BFE
0028057BC61C772378E60FC61C772300
0000000000545D213C48010300EDB03E
C806FF10FE3D20F93AD543FE0028043D
32D543CDDE443EFFF32D74321000022A5
4322A743000000CD16433EC806FF10FE
3D20F9C0F845C3624608080808080808
0838302E3131002734333A380E1C1C1C
3D
```

CHECKSUM LINE 18 = 20945

LINE 19: ADDR.=18502: BYTES=140

```
2A0C4011D50119545D213048010C00ED
B0626B3AD543FE052005361CC3B248FE
0420020604FE0320020608FE02200206
12FE0120020616FE002002062078CB3F
CB3FCB3FCB3FF002804C61C772378E6
0FC61C7723361C23545D213C48050103
00EDB0C13A414480273241443EC806FF
10FE3D20F93EFFF32434C30548080808
08080808080808080808080808080808
```

CHECKSUM LINE 19 = 10503

Oh, yes. There's more!!

If you can't remember all of the commands, press <H> for the help file. Press any key to go through the help file. Press <M> to go to the Main Menu. From this point you may Save or Load your display. There are several options here too.

You can Save your picture as a SCREEN\$ or from memory location 50000. If you save a Screen\$, then all of the attributes will be saved with your picture. If you save from high memory, then you have the option of saving 1/3, 2/3 or all of the picture. This will save loading time as you develop new drawings.

To clear your display and start fresh, press <X>. you will be prompted to verify your entry. Press enter to resume your work. To exit the program, press <Q>. DO NOT RUN the program! Use GO TO 1 to restart it. Have fun!!

John T. Nguyen
1000 Phillips Lane
Louisville, KY 40213

After loading a picture, you will be in the Big Pix mode. Part of the picture will be displayed in the upper left hand corner of the screen. Its enlarged version will fill the screen. By using <Caps Shift> and I, J, K and L (up, left, down and right, respectively); you may scroll the enlarged screen to various parts of your overall creation. I, J, K and L used without the <Caps Shift> will move the cursor around on the screen itself. These cursor control keys will henceforth be referred to as <Arrow> keys.

To view the entire picture, press <U>. Included in the picture is a small box which is used to enclose the area of the picture that you want to fix. Now use the arrow keys to move the box around. By holding down the <Caps Shift> and using the arrow keys, the box will move faster.

Pressing <O> will invert the video. <Y> will display the attributes associated with the picture in view. <P> will dump the picture to the 2040 printer.

Press <U> to enter Big Pix mode again. To see the row and column number, press <P>. Press <P> again to turn it off.

To enter the Draw mode, press <A>. The border of the screen will now be black. As you move the cursor, you will draw your art. To erase, press <S>. The border will now be Cyan. Again, move the cursor to erase. Press <D> to resume normal cursor movement. You may also press <O> to invert the screen in this mode.

Listing 1. PIXCODE

enter and run this program first to create and save the PIXFIX machine code.

```

1 REM --- PIX.CODE ----
3 CLEAR 36911
5 POKE 23692,0
10 LET BEGIN=100
15 LET END=340
20 FOR L=BEGIN TO END STEP 10
25 PRINT "* WORKING ON LINE: "
;L: LET N=36912: LET SUM=0
30 RESTORE L: LET N=N+6.4*L-64
0
35 READ CSUM,X$
40 FOR J=0 TO 63
45 LET HI=CODE X$(J*2+1)-67
50 LET LO=CODE X$(J*2+2)-67
55 LET V=HI*16+LO
60 POKE N,U: LET N=N+1
65 LET SUM=SUM+V
70 NEXT J
75 IF SUM<>CSUM THEN PRINT "*
ERROR IN LINE: ";L: STOP
80 NEXT L
85 PRINT : PRINT "* YOU GOT EV
EVERYTHING RIGHT !!!": PRINT
90 REM --- SAVE CODES ----
95 SAVE "pix.code"CODE 36912,1
544: PRINT "* REWIND TAPE AND PR
ESS PLAY TO VERIFY.": VERIFY "
pix.code"CODE
100 DATA 6474,"JLCJJCJCJMKQIOJMK
CJCJIRJJCRCRCRCQIDKRDQKQKRGCMKQI
AKMKIJJFLJLJCJCJCJCQDCRCRCRPLFQ
CKCKOPJCLCDHJJCCKCGDFFPRCCCECRELD
OPGOLCDDKHINERQ"
110 DATA 6213,"CCEKCGCDCCOCCOLCD
DDCCCLNIJJOLERMJJJOLMJJOLARACNQ
NQNQNNQKCCRCCKCKCKCKCKCCDCDCD
CNCDCDCDCDCDFKJQJQJQJFKFKFKDCFCJ
RAJRFCDCCKCCQCORQ"
120 DATA 6474,"RRRQCCCKCCCFKFKFK
FKRQJQJFKDCCKCKCKCKCKCKCKCQIHJDI
CCQJLDCQCPHQHOPFFCLCDDHCKFCLHMF
IOLCQPIKLCLQRLQDDDFEIOLCCKCHDDKHL
DCDCDDPKLQDDQDDH"

```

```

370 IF EC<255 THEN POKE 37219,
EC: RANDOMIZE USR 37216
375 IF BC:=0 THEN POKE 37219,BC
: RANDOMIZE USR 37216
380 RETURN
388 REM --- GET KEY ---
390 IF K$="I" THEN LET SR=SR-A:
IF SR<0 THEN BEEP .1,8: LET SR=
0
395 IF K$="J" THEN LET SC=SC-A:
IF SC<0 THEN BEEP .1,8: LET SC=
0
400 IF K$="K" THEN LET SR=SR+A:
IF SR>168 THEN BEEP .1,8: LET S
R=168
405 IF K$="L" THEN LET SC=SC+A:
IF SC>224 THEN BEEP .1,8: LET S
C=224
410 RETURN
790 REM --- MENU ---
820 GO SUB 1020: PRINT AT 10,6:
"PRESS : TAB 6; * M - FOR THIS
SCREEN" TAB 6; * H - FOR HELP S
CREENS" TAB 6; * C - TO CREATE P
ICTURE" TAB 6; * L - TO LOAD PIC
TURE" TAB 6; * S - TO SAVE PICTU
RE"
823 PRINT TAB 6; * X - TO CLEAR
PICTURE" TAB 6; * P - TO COPY T
O PRINTER" TAB 6; * Q - TO QUIT"
: GO SUB 999: PRINT AT 9,13; "ME
NU "
824 INPUT "": PRINT #0; " PICK
OPTION OR PRESS <ENTER>"
825 LET K$=INKEY$: IF K$="" THE
N GO TO 825
830 IF K$="h" THEN INPUT "": GO
SUB 997: GO TO 850
831 IF K$="c" THEN GO TO 2000
832 IF K$="s" THEN IF ST THEN G
O SUB 997: GO TO 1040
834 IF K$="l" THEN GO SUB 1450:
CLS : GO TO 820
836 IF K$="p" THEN CLS : RANDOM
IZE USR 37183: COPY : GO TO 820
837 IF K$="x" THEN INPUT "": PR
INT #0; " ARE YOU SURE? (Y/
N)": GO SUB 990: GO TO 824
839 IF K$="q" THEN CLS : POKE 2
3692,25: PRINT AT 21,0; * TYPE <
GO TO 1> TO CONTINUE OR VARIA
LES WILL BE CLEARED FROM MEMORY
": FOR J=1 TO 19: PRINT : NEXT
J: STOP

```


Listing 2.(cont.)

```

840 IF K$=CHR$ 13 THEN IF ST TH
EN GO SUB 40: GO TO 50
846 GO TO 825
847 REM
848 REM --- HELP SCREENS ---
849 GO SUB 1020
850 PRINT AT 10,1:"(ARROW)"TAB
2:"KEYS IN BIG PIX MODE:"
"↑ HOLD DOWN <CAPS SHIFT>"
"← <ARROW> KEYS TO MOV
E"
"↑ L↑ ENTIRE SCREEN."
"K↑↑ USE <ARROW> KEYS
ALONE"
TAB 9:"TO MOVE CURSOR."
852 PRINT TAB 25:"Page 1"
PRESS ANY KEY TO CONTINUE": P
LOT 67,100: DRAW 0,-96: PLOT 74,
78: DRAW 116,0
860 GO SUB 999: PRINT AT 9,14:"
HELP": PAUSE 0: GO SUB 997
862 PRINT AT 11,5:"PRESS:"
TAB 5:"A - FOR DRAW MODE"
TAB 5:"S - FOR ERASE MODE"
TAB 5:"D - FOR NEUTRAL MODE"
TAB 5:"P - TO PRINT ROW/COLUMN"
TAB 5:"O - TO INVERT SCREEN"
864 PRINT TAB 5:"U - FOR SCRE
EN MODE"
TAB 25:"Page 2"
866 GO SUB 999: PRINT AT 9,14:"
HELP": PAUSE 0: GO SUB 997: IN
PUT ""
870 PRINT AT 10,1:"(ARROW)"TAB
2:"KEYS IN SCREEN MODE:"
"↑ L↑ I (ARROW) KEYS"
"↑ J L↑ MOVE BOX (STEP 1)"
"K↑ MOVE BOX (STEP 2)"
871 PRINT "PRESS: Y - FOR A
TTRIBUTES"
TAB 10:"U - FOR BIG P
IX MODE"
873 PRINT TAB 25:"Page 3": PLOT
67,100: DRAW 0,-65: DRAW -67,0:
PLOT 74,78: DRAW 108,0
876 GO SUB 999: PRINT AT 9,14:"
HELP"
#0:"PRESS <M> FOR MENU
OR <ENTER>": PAUSE 0
877 LET K$=INKEY$: IF K$="" THE
N GO TO 877
878 IF K$="m" THEN CLS : GO TO
820
879 IF K$=CHR$ 13 THEN IF ST TH
EN GO SUB 40: GO TO 50
885 GO TO 877
980 REM -----
990 IF INKEY$="4" THEN RANDOMIZ
E USR 37253: INPUT "": PRINT #0;
TAB 13:"DONE": PAUSE 90: RETURN
991 IF INKEY$="n" THEN RETURN
992 GO TO 990
996 REM -----
997 FOR J=9 TO 21: PRINT AT J,0
": NEXT J: RETURN

```

```

998 REM -----
999 PLOT 0,100: DRAW 255,0: DRA
W 0,-97: DRAW -255,0: DRAW 0,97:
RETURN
1010 REM -----
1020 CLS : BORDER 7: LET FL=0: R
ANDOMIZE USR 37349: PLOT 4,108:
INK 7: DRAW 0,3: PLOT 5,107: DRA
W 246,0: PLOT 252,108: DRAW 0,3:
RANDOMIZE USR 37268: PLOT 252,1
12: INK 0: POKE 37295,1: RETURN
1030 REM --- SAVE PICTURE ---
1040 PRINT AT 11,3:"PRESS:"
"↑ S - TO SAVE AS A SCREEN"
"↑ L - TO SAVE FROM MEMORY"
1043 GO SUB 999: PRINT AT 9,13:"
SAVE"
1045 LET K$=INKEY$: IF K$<>"s" A
ND K$<>"l" AND K$<>CHR$ 13 THEN
GO TO 1045
1047 IF K$=CHR$ 13 THEN GO TO 82
0
1050 IF K$="l" THEN GO TO 1070
1053 FOR J=15 TO 11 STEP -1: PRI
NT AT J+1,3:"
"AT J,3:"
SAVE AS
A SCREEN"
PAUSE 5: NEXT J
1055 INPUT "BORDER COLOR? (0-7):
": LINE B$: IF B$="" THEN GO TO
820
1057 IF B$<>"0" OR B$>"7" THEN GO
TO 1055
1060 BORDER VAL B$: CLS : RANDOM
IZE USR 37183: RANDOMIZE USR 374
15: SAVE N$SCREEN$: GO SUB 40:
CLS : GO TO 820
1070 FOR J=15 TO 11 STEP -1: PRI
NT AT J+1,3:"
"AT J,3:"
SAVE FRO
M MEMORY"
PAUSE 5: NEXT J
1075 PRINT AT 13,4:"PRESS:"
"↑ 1 - TO SAVE 1/3 OF SCREEN"
"↑ 2 - TO SAVE 2/3 OF SCREEN"
"↑ 3 - TO SAVE ALL OF SCREEN"
1080 PLOT 0,60: DRAW 0,-50
1085 LET K$=INKEY$: IF K$<>"1" A
ND K$<>"2" AND K$<>"3" AND K$<>C
HR$ 13 THEN GO TO 1085
1088 IF K$=CHR$ 13 THEN GO TO 82
0
1090 INPUT "": SAVE N$CODE 50000
,2048*VAL K$
1120 INPUT "": PRINT #0;"
VERIFY CODES? (Y/N)"
1125 GO SUB 1400: IF INKEY$="n"
THEN GO TO 820
1145 PRINT "N$CODE 50000,"
2048*VAL
K$: VERIFY N$CODE: PRINT "FLAS
H 1:"
TURN OFF RECORDER": PAUSE 6
0: GO TO 820
1200 GO TO 1045

```

```

1400 REM --- VERIFY ---
1405 INPUT "": PRINT #0;"
VERIFY CODES? (Y/N)"
1410 IF INKEY$<>"Y" AND INKEY$<>
"N" THEN GO TO 1410
1425 IF INKEY$="n" THEN RETURN
1430 CLS : PRINT "REWIND TAPE
AND PRESS PLAY TO VERIFY"
1435 IF IN 254<>95 THEN GO TO 14
35
1440 RETURN
1450 REM --- LOAD ---
1460 CLS : PRINT "ENTER NAME O
F PICTURE:"
INPUT N$
1465 IF N$="" THEN RETURN
1470 LET ST=1: PRINT "PRESS P
LAY ON RECORDER:"
GO SUB 1435:
PRINT "LOADING:"
N$;
"CODE 50000:"
LOAD N$CODE 5000
0: PRINT "FLASH 1:"
TURN OFF REC
ORDER": PAUSE 120: GO SUB 40: GO
TO 50
1980 REM -----
2000 INPUT "NAME OF PICTURE? ":N
$: IF N$="" THEN GO TO 2000
2005 IF LEN N$>10 THEN GO TO 200
0
2010 LET ST=1: GO SUB 40: GO TO
50
2070 REM
2980 REM --- PROGRAM STARTS
HERE.
2990 CLEAR 36911: LOAD "pix.code
"
CODE 36912: CLS : PRINT AT 11,7
: FLASH 1:"
TURN OFF RECORDER": P
AUSE 120
3000 LET N=47661: FOR J=1 TO 30:
POKE (N+J),7: POKE (N+32+J),7:
POKE (N+64+J),7: POKE (N+96+J),7
: POKE (N+128+J),4: POKE (N+160+
J),4
3005 POKE (N+192+J),5: POKE (N+2
24+J),5: POKE (N+256+J),7: NEXT
J
3010 FOR J=0 TO 8: POKE (N+J+32)
,7: POKE (N+J+32+31),7: NEXT J
3013 LET N$="PICTURE": POKE 3729
5,0: LET ST=0
3015 POKE 23728,51: POKE 23729,1
46: RANDOMIZE USR 37361
3020 POKE 23658,0: LET FL=0: LET
SR=87: LET SC=121: LET GR=11: L
ET GC=16: LET PR=0
3023 POKE 23658,0: POKE 23675,13
3: POKE 23676,144
3030 GO TO 820
9960 REM
9970 REM --- SAVE ROUTINE ---
9999 SAVE "pix fix"
LINE 2990: S
AVE "pix.code"
CODE 36912,1544: C
LS : PRINT "REWIND TAPE AND P
RESS PLAY TO VERIFY": VERIFY "
pix fix": VERIFY "CODE

```

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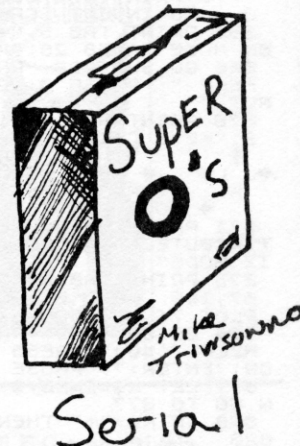
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